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AN INDEX OF INSECURITY FOR COMMUNITY POLICING

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Summary

With the advent of community policing, the notion of insecurity complexified. New dimensions such as the sense of safety, levels of incivilities, or the fear of crime joined the traditional crime rates to defined its larger perimeter. If, added one to another and often measured by crime victimization surveys, they account better for the notion of local public safety in its globality, the multiplication of indicators is a real challenge for interpretation and complicates comparative analyses and impact studies. We miss a single indicator summarizing the richer information. Advances in computing multidimensional indexes may change this. Inspired by studies of poverty, this paper shows how to compute an index measuring local insecurity while accounting for its complexity. It then formulates a series of synthetic indicators measuring the incidence of insecurity, its severity, rates of extreme insecurity, and “sensitive” neighborhoods. These indicators - and how they can be useful for defining local strategies of community policing - are illustrated with examples from cities in the Republic of Guinea and the Democratic Republic of Congo.

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Measuring insecurity

The most significant aspect of community policing is to have repositioned neighborhoods' residents at the center of the policing agenda. Insecurity or public safety, so says the doctrine, may not be simply measured by objective crime rates. Other elements matter. Insecurity, once we take the perspective of residents, is a more complex and more subjective phenomenon than formerly assumed. Feeling safe, being exposed to incivilities, the fear of burglary, trusting the police, all these dimensions contribute to define insecurity and deserve appropriate responses from the community police authorities.

The acknowledgment of the complexity of insecurity has prompted the necessity to measure it differently than solely through crime statistics. This task was imparted to victimization surveys which became increasingly popular since the eighties. Typically, the sense of safety is captured by a standard question featured in most such surveys measuring residents' sense of safety after dark, when walking alone in their neighborhood. Crime victimization, the fear of crime or police image are measured internationally by standardized questions. This development gave rise to comparative studies and allowed for the monitoring of the fluctuation of individual indicators in given territories over time. These measurements, conducted by International Crime Victims Surveys, European Crime and Safety Surveys, national surveys and local security diagnostics, belong to the navigation instruments of numerous police departments around the world and have become a best practice of police governance.

While a real breakthrough for advancing the community policing agenda, the multiplication of insecurity indicators has created difficulties on its own. In practice, authorities and researchers alike face challenges interpreting a large palette of indicators that might not all move in the same direction at the same time. If the addition of all single indicators may theoretically account better

for the larger perimeter of insecurity, in practice it proves a real challenge to the interpretation of insecurity in its globality as we lack a single indicator capable of summarizing the now richer information provided by its many dimensions. Recent advances in computing multidimensional indexes offer new perspectives. It has become possible and simple to construct a global measure of insecurity without losing the information derived from its complexity.

The ambition of the paper is not theoretical and I will not discuss in detail the difficult and important question of what dimensions truly constitute local insecurity. I will content myself with a minimal, plausible identification of its main dimensions, to arrive rapidly at the heart of the paper: propose to apply a practical method of construction of a multidimensional index using data that are often available in international crime victimization studies while reflecting community policing approach. After a presentation of the methodology, I shall formulate some indicators such as the *incidence of insecurity*, its *severity*, rates of *extreme insecurity* and the “*sensitivity*” of neighborhoods. These indicators – and their potential use for defining local strategies of community policing – are illustrated by examples of African cities using data collected in 2016.

A multidimensional index of insecurity

To measure local insecurity, I start from the individual perspective of neighborhood residents and build an index with five dimensions. The individual victimization in the neighborhood is its first dimension and, probably, its most traditional to measure insecurity. Apart from criminality, major incivilities do contribute to insecurity as experienced by residents. The term ‘major’ refers to the level of seriousness of types of incivilities as defined by residents. Studies of police call centers show that incivilities are a main source of calls to police to resolve the problems. The exposure level to major incivilities in the neighborhood is thus the second dimension of the index. The third dimension is the sense of safety or fear of crime. I will use several indicators to measure this dimension as we will see below. The fourth dimension is inspired by poverty studies that have included access to water, health, and schools in their analysis of this multidimensional phenomenon. Similarly, the access to security services – their proximity, the visibility of police patrols in the neighborhood or the sense of police force capacity to intervene rapidly – contribute to insecurity levels. Finally, the last and fifth dimension I use is the trust in

the police. While police access matters, the trust in the police is also critical to define insecurity from a resident perspective.

Insecurity, as covered by these five dimensions in this paper, does not consider the access to other security providers such as local self-defense groups, community organizations or other local administration groups such as the *chefs de quartier*¹. For a more comprehensive approach, access to informal security providers should be included in the index as they contribute sometimes significantly to security. In Africa, including in some cities we will analyze, informal groups are major providers of security. In this paper, however, they were not included as one of the aims of the analysis is to identify gaps in policing.

To compute the index of insecurity, I use the original methodology advanced by Alkire and Foster (AF)², which, at its origin, was conceived to measure poverty. The methodology being generic, it applies to any complex object that can be defined as multidimensional. The approach consists of several main steps. After having identified the dimensions of insecurity and its indicators, individual cutoffs of insecurity are determined for each indicator. Then a second cutoff is applied to the entire set of indicators. Only those individuals that fulfill the two conditions or cutoffs will be counted as unsafe in the index.

The data

The data used to compute and to illustrate the use of the index was collected in Spring 2016 by the NGO Coginta in partnership with the universities of Sonfonia (Republic of Guinea), Lubumbashi (in Lubumbashi, Democratic Republic of Congo), and Mbujimayi (in Mbujimayi, Democratic Republic of Congo). They originate from representative surveys conducted in the urban communes of Coyah and Dubréka (suburb of Conakry)³, Annexe, Kampemba and Rwashi (City of Lubumbashi),⁴ and Bipemba and Muya (City of Mbujimayi). In each commune, a minimum of 1200 face-to-face interviews were conducted based on samples of households distributed proportionally to the number of households in the administrative neighborhoods

¹ The *Chefs de quartier*, or administrative representative at neighborhood level, do play an important role in securing people, receiving complaints and solving conflicts in the two countries studied in this paper.

² Cf. <http://www.ophi.org.uk/research/multidimensional-poverty/how-to-apply-alkire-foster/>

³ Diagnostic local de sécurité 2016. Coyah et Dubréka, Coginta, Genève (<http://www.securitymap.org/fr/rapports-5.html>).

⁴ Diagnostic local de sécurité 2016. Lubumbashi et Mbujimayi. Rapport intermédiaire, Coginta, Genève (<http://www.securitymap.org/fr/rapports-2.html>).

("quartiers") that compose the communes. All neighborhoods were included in the sampling. In Guinea, the random sample was created in collaboration with the National Institute for Statistics using the 2014 population census data. In the absence of census data for the Democratic Republic of Congo (DRC), the samples were created using satellite imagery and a formula based on the dimension and number of identified lots. The samples cover all neighborhoods in all studied communes. The spatial distribution of the samples was important as the objective was to allow finer analyses at the neighborhood level. Enumerators were graduate students of the partner universities who were trained by Coginta for a week in the questionnaire, the sampling technique once a household was identified, and how to manipulate the smartphones used for data collection. GPS coordinates of interview locations were systematically collected to allow the survey management to control the implementation of the sampling plan. Digital interview data was synchronized daily with the main dataset for quality controls. In Guinea, enumerators benefited from the support of the "*chefs de quartier*" who have personal knowledge of individual residents and identified for them the location of the sampled households. In DRC, household GPS coordinates were registered in offline maps available on the smartphones of the enumerators who understood how to position themselves using satellite guidance. To create the samples, the survey management had mapped the administrative boundaries of the neighborhoods and communes prior to conducting the survey, in coordination with the local chefs de quartier and the local authorities.

Indicators

To measure all five dimensions of the index, I use 20 indicators from the surveys in the seven urban communes studied. The indicators are presented in Table 1 below. For practical purposes, I assume that each dimension contributes in the same proportion, that is 20%, to global insecurity. Within each dimension, I similarly consider that each indicator contributes to the dimension identically. The only weights I use in the formula correct for the variations in numbers of indicators used by dimension. The weights are calculated on a basis of 4 indicators by dimension. Thus, for instance, the 3 indicators of criminality are multiplied by a coefficient of 1.33 while the 6 indicators of the sense of safety dimension are multiplied by a factor of 0.66. Finally, to deal with missing data, the indicator average in the commune replaces missing data for each indicator for all individuals, allowing them to be included in the analysis.

Table 1 : Indicators by dimension of the index of insecurity

Dimensions and indicators	Cutoff
<i>Victimization in the commune</i>	
1. Burglary	At least 1 burglary over 3 years
2. Aggression	At least 1 aggression over 3 years
3. Sexual aggression	At least 1 sexual aggression over 3 years
<i>Exposure to major incivilities in the neighborhood</i>	
4. Aggressive youth gangs	Relatively or very frequent
5. Drug dealing and drug use	Relatively or very frequent
6. Fights between residents	Relatively or very frequent
7. Insalubrity of neighborhood	Relatively or very frequent
<i>Sense of safety in the neighborhood</i>	
8. Sense of safety during day time	Rather or very unsafe
9. Sense of safety after dark	Rather of very unsafe
10. Rating level of security	4 on a cale of 10 (10 = very safe)
11. Evolution of security	Dégradation
12. Security as primary concern	Yes
13. Likelihood of being victim of a crime in the next 12 months	Rather or very likely
<i>Access to neighborhood police</i>	
14. The police patrol regularly	Rather or very seldom
15. The police intervene rapidly when called for an urgency	Rather or not at all
16. The police is close to the population	Rather not or not at all
<i>Trust in the neighborhood police</i>	
17. The police is fair	Rather or not at all
18. Image of the police fighting criminality	Rather bad or very bad
19. Evolution of the quality of the police	Deteriorates
20. The police is capable of ensuring security	No

The first stage consists in setting cutoffs of insecurity by indicator. These cutoffs specify whether an individual can be said safe or not safe. The way I have set the cutoff for the 20 indicators is shown in column 2 of Table 1. When computing the data, the value “1” is attributed to everyone that crosses the cutoff for each indicator. Others obtain the value “0”. Taking as example the indicator of sense of safety when walking alone in neighborhood streets after dark, residents who respond “not very safe” or “not safe at all” obtain the value “1”. This operation is replicated

for all individuals and indicators. By the end of this operation, all individuals have either the value “0” or “1” for all indicators. An individual can accumulate 20 points at the maximum.

The second stage establishes an overall cutoff. This is the multidimensional cutoff. Individuals that will cross the second cutoff will be taken into the final group of unsafe respondents. In the index constructed here, I have set the cutoff at 60% of all indicators. That is, if a respondent has 12 points or higher, he is categorized as unsafe. During this operation, unsafe individuals receive the value “1” while all others are recoded “0” for all indicators. This final stage is called the “censor” stage and should not be omitted as it will be critical to compute the indicators derived from the methodology.

The incidence of insecurity

A first indicator derived from the method measures the incidence of insecurity H_0 . It corresponds to the proportion of individuals who have crossed the second cutoff. In Table 2, H_0 is calculated for the 4 Guinean and Congolese cities I used for illustration.

Comparatively, incidence levels of insecurity are more modest in Guinea than in Congo. Rates are 14% in Coyah and 12.7% in Dubréka. In DRC, the rates are almost twice higher for both cities. On average, the incidence of insecurity affects 22.8% of residents in Lubumbashi and 24.5% in Mbuji mayi.

The second indicator adjusts the incidence by the severity of insecurity. The severity (S) can be obtained by calculating the mean ratio of points cumulated individually by unsafe residents. In Guinean cities, insecurity is less severe (0.67) than in Congolese cities (0.69). Not only are Congolese cities less safe but the severity of insecurity is higher than in Guinea. By multiplying H_0 by S, an adjusted measure of insecurity H_1 can be computed. It measures more accurately levels of insecurity than the raw H_0 .

Table 2 : The indicators of insecurity in the Guinean and Congolese cities

Indicators	Coyah	Dubréka	Lubumbashi	Mbuji mayi
H_0 (incidence of insecurity)	14.0	12.7	22.8	24.5
S (severity of insecurity)	0.67	0.67	0.69	0.69
H_1 ($H_0 * S$, adjusted incidence of insecurity)	9.4	8.5	15.8	16.97
H_2 (incidence of extreme insecurity)	1.83	1.16	4.51	4.81

Other indicators can be computed. By analogy to poverty measures that target extreme poverty, community policing may focus on residents affected by extreme insecurity. An indicator of extreme insecurity can be constructed in different ways. A first approach may keep unchanged the second cutoff but raise the level of insecurity for the first cutoff. Thus, for instance, only those who feel “very unsafe” walking the streets of their neighborhood alone after dark would be considered unsafe. For each indicator, the cutoff can be set higher. The second approach is to keep the first cutoff unchanged but raise the second cutoff. A combination of the two approaches is a third option. Following the second approach, Table 2 shows the results of the computation when the second cutoff is set at 75% of all indicators instead of 60%. H_2 measures levels of incidence of extreme insecurity. Per this formula, 4.51% of residents of Lubumbashi and 4.81% of residents of Mbuji mayi fall into the category of extreme insecurity. Extreme insecurity is marginal in Guinea. If we look closer at Lubumbashi, extreme insecurity culminates in Kampemba where it affects 7.19% of residents. In some neighborhoods of the commune, extreme insecurity is much higher as I will discuss in a section below.

Dimensions that contribute most to insecurity

The AF method of computing pluridimensional indexes allows the identification of dimensions that account most for the insecurity of the unit under analysis. This opens a path to specify priority strategies of community policing. To measure the contribution of the dimensions to insecurity, the mean proportion of the dimension for the group of unsafe residents is calculated. Applied to the Guinean and Congolese cities, the results are displayed in Table 3. The access to services, trust in the police, and the level of incivilities contribute comparatively much more to insecurity than victimization and sense of safety. The weight of the dimensions varies slightly across cities.

In Guinea, access to police services is the dimension that contributes most to the incidence of insecurity (Cf. Table 3). It contributes 28.6% to this rate. In DRC, this dimension contributes equally more than others to insecurity (24.8%). The lack of trust in the police contributes also proportionally more than others to insecurity in both countries. In Guinea, its share is 25.1% and 24.8% in DRC. Incivilities’ contribution to insecurity is above average in both countries. Victimization and sense of safety are more marginal contributors when insecurity is considered globally. These results may be supporting evidence for authorities in both countries who

introduced community policing with the firm belief that access to policing services and the trust in the police matter most.

Table 2 : Contribution of the dimensions of the index to the insecurity incidence in Guinea and DRC

	Guinea	DRC
	%	%
Crime	6.8	9.2
Incivilities	21.4	21.6
Sense of safety	18.4	19.7
Access to police services	28.3	24.8
Trust in the police	25.1	24.8
Total	100%	100%

Priority territories, sensitive neighborhoods and the 3rd cutoff of insecurity

Raw and adjusted incidence of insecurity measures are useful when comparing cities or, when feasible, smaller units such as communes, districts or neighborhoods. At this micro level, sensitive territories can be identified that may be targeted by community policing. With the index methodology proposed, an indicator of sensitive territories can be operationalized in different ways. One option is to measure sensitivity using the indicator H_2 of extreme insecurity and specify a third cutoff. When extreme insecurity reaches the cutoff, the neighborhood qualifies as sensitive. An alternative way to operationalize sensitivity is by setting the third cutoff using H_0 . When the incidence of insecurity reaches a high proportion, the neighborhood is sensitive. The first approach pays attention to the intensity of insecurity while the second favors an extensive definition by looking at how many people are affected by insecurity. I will illustrate this idea by discussing briefly the case of the commune of Kampemba in the city of Lubumbashi.

Kampemba is the commune of the city of Lubumbashi with this highest rate of incidence of insecurity. H_0 reaches 25.8% in Kampemba compared to 22.4% and 19.9% in Annexe and Rwashi, respectively. The severity of insecurity is also higher in Kampemba than in the other communes studied in the city of Lubumbashi. Thus, the adjusted incidence rate (H_1) amplifies the differences observed between the three communes. H_1 reaches 18.3 in Kampemba, 15.2 in Annexe and 13.6 in Rwashi.

Even though the margin of error becomes important for units of analyses below the communal level and analyses at this sublevel are to be conducted with caution, the samples in Lubumbashi were created to cover all neighborhoods (the administrative units called quarters in DRC) and allow analyses of “tendencies” in these units. Among the 9 neighborhoods of Kampemba, two display very high levels of incidence of insecurity. H_0 jumps to reach 50.74% of residents in Bogonga and 45.67% in Kigoma. As the severity of insecurity is also higher in both neighborhoods than elsewhere in the commune, the levels reached in Bogonga and Kigoma with H_1 are even more spectacular when compared to the other neighborhoods (cf. Table 4).

To account for these extraordinary rates, one may consider the expression « sensitive neighborhood » as appropriate. Specifying cutoffs is always a matter of convention and somewhat arbitrary or policy-oriented. In the Lubumbashi case, one might decide to set this cutoff at 40% of the incidence of insecurity. In Kampemba, only Bogonga and Kigoma would then qualify as « sensitive neighborhoods ». Using this cutoff, Kasungami in the commune of Annexe and Congo in the commune of Rwashi also qualify. Alternatively using the scale of extreme insecurity gives similar results. Bogonga and Kigoma are neighborhoods where both insecurity and extreme insecurity reach a high proportion of residents.

Identifying sensitive neighborhoods can help authorities set strategies to reduce insecurity. In the commune of Kampemba, the two neighborhoods of Bogonga and Kigoma are responsible for 49.1% of the incidence of insecurity (H_0) in the commune. Insecurity being more severe in both neighborhoods, their contribution to the adjusted measure of insecurity (H_1) of Kampemba is even higher reaching 51.5%. A local plan of security that would manage to reduce by half the adjusted incidence of insecurity in the two sensitive quarters of Kampemba would reduce insecurity overall in the commune by 23%. All other things being equal, this means that Kampemba would become the safest commune of the three studied in Lubumbashi. The incidence of insecurity level would indeed stabilize at 18.5% in Kampemba while Rwashi, which is the safest commune today, features a rate at 20.2%. If we add that access to service and trust in the police are the two main contributors to insecurity in DRC, Kampemba authorities are already in possession of critical elements for planning a community policing strategy. An efficient formula would combine higher access and trust in policing focusing on the two sensitive neighborhoods of the commune.

Table 3 : Incidence rates and severity of insecurity in the neighborhoods of the commune of Kampemba

	Hewa Bora	Kampemba	Bel Air 1	Kigoma	Kabetsha	Bel Air 2	Bogonga	Kafubu
H₀	5.74	14.63	9.24	45.67	11.11	29.70	50.74	29.18
S	0.65	0.65	0.65	0.73	0.70	0.71	0.76	0.67
H₁	3.73	9.51	6.01	33.34	7.78	21.09	38.56	19.55
H₂	0	0.61	0	16.54	2.47	6.93	29.41	3.0

Insecurity: a phenomenon linked to informal dwellings in Lubumbashi

More targeted strategies aiming at reducing insecurity may require analyzing the profile of unsafe residents and developing interventions for the most vulnerable among them. In this section, I will show for instance that the kind of urbanism creates vulnerabilities as insecurity is highly linked to informal dwellings in Lubumbashi. Lubumbashi neighborhoods were regrouped in three categories. This first is the category of residential neighborhoods inhabited by the educated, higher income households residing in villa-type housing. The second category is the popular neighborhoods where, traditionally, the black working class resided in Lubumbashi. Today, these neighborhoods are densely populated, lots are small, and are occupied by the lower middle class of Lubumbashi. The third type of neighborhoods are the low-income ones built mainly in the distant suburb of Lubumbashi in the commune of Annex or the informal dwellings of sections of the central communes that occupy the historic *no man's land* between the white colonial city and the popular working-class neighborhoods. Access to water, health and education are poor in these informal neighborhoods.

The incidence of insecurity proves to be about twice as large in informal dwellings than in residential and popular neighborhoods (cf. Table 5). For all indicators, these informal neighborhoods fare poorly compared to the two others. The severity of insecurity is higher and the incidence of extreme insecurity more than three times higher than in residential and popular neighborhoods. As these informal neighborhoods are built in newly settled areas in the suburb of Lubumbashi or areas, they typically lack police services that are concentrated in older traditional parts of the city.

Table 4 : Indicators of insecurity distributed by categories of habitat in Lubumbashi

Indicateurs	Residential	Popular	Informal
H ₀ (incidence)	15.2	17.5	30.0
S (severity)	0.68	0.68	0.70
H ₁ (adjusted incidence)	10.3	11.9	21.0
H ₂ (incidence of extreme insecurity)	1.9	2.0	7.3

Conclusion

The AF method opens new avenues for measuring local insecurity in a simple manner while accounting for its multiple dimensions. It offers new ways to compare territorial units. It allows rationalizing strategies aimed at reducing insecurity using one measurement that reflects the daily experience of neighborhood residents better than crime statistics do. It provides the police with a new tool for measuring its efficiency and effectivity in reducing insecurity. The paper, however, remains exploratory, even preliminary, considering that it covers broad territories that necessitate prior detailed discussion. What are the ingredients or dimensions that should be included in the definition of an index of insecurity? How to measure them? What weights should have the various dimensions in the index? The objective of the paper is not to discuss these important questions. Their relevance is clear now that we have seen how a multidimensional index of insecurity can be constructed and how useful it might be. Once such an index is consensual, it can be a powerful tool for defining strategies of community policing as we tried to illustrate for the commune of Kampemba, Lubumbashi. Incidence rates of insecurity could be defined, vulnerable territories identified, the severity of insecurity measured, at-risk population groups discovered and, as the index data is measured at individual level, finer analytical possibilities are immense. The already standardize questions of victimization surveys and the popularization of such surveys in policing departments worldwide opens new opportunities for comparative studies and possibilities for measurement of achievements in pursuing the Millennium goal of safer cities.

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